

REMARKS

Claims 1-20 are pending in the application. Claims 1-18 have been rejected and claims 19-20 have been objected to.

Amendments

Claim 1 has been amended to clarify that the readily or sparingly soluble salt is added to the intermediate product, and further to affirmatively recite the formation of the antimicrobial plastic product. Support for this amendment is located at paragraph [0024] and paragraph [0027] of the present published application.

Claim 5 has been amended to recite that the claimed ratios are weight per weight. Support for this amendment is located throughout the original specification, whereby all amounts and ratios are expressed as being measured by weight.

Claim Rejections – 35 USC § 112

Claims 1 and 5 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 has been amended to incorporate the clarification that the readily or sparingly soluble salt is added to the intermediate product in step C. Importantly, the treatment with the colloidal metal and the addition of the sparingly soluble salt describe two different and independent features/steps of the present invention. Furthermore, step D has been added, which defines that the antimicrobial plastic product is formed. Step D clarifies that the intermediate product having both the treatment with the antimicrobial colloidal metal and the additionally added sparingly soluble salt of an antimicrobial metal is formed into an antimicrobial plastic product.

Claim 5 has been amended to affirmatively recite that the ratios are calculated as weight per weight ratios.

It is respectfully submitted that these amendments overcome the objections under 35 USC § 112.

Claim Rejections – 35 USC § 102

Claims 1, 6-14 and 16 have been rejected under 35 U.S.C. 102(b) as being anticipated by Jacobson et al. (U.S. Patent No. 5,503,840).

The present invention is directed to a method of producing plastic products that exhibit satisfactory antimicrobial activity, i.e. provide immediate as well as long-term action against microorganisms (please refer to paragraphs [0006], [0008] and [0013] of the present published application). In order to achieve this objective, two different steps are performed according to the claimed method of producing in antimicrobial plastic product:

Treatment with a colloidal metal

First of all, at least one constituent of the intermediate product (e.g. an inorganic compound such as barium sulfate) is treated with an antimicrobial *colloidal* metal (see step B). It is important that the metal is present in colloidal form and not for example in form of a coating. Only deposited colloidal antimicrobial metal provides a sufficient long term antimicrobial effect. The colloidal metal is therefore present on the constituent of the intermediate product in very finely dispersed form (nanoparticles), thereby providing a very good long-term antimicrobial activity. Furthermore, because the colloidal metal is present on a constituent of the intermediate product which is then/afterwards formed to the actual antimicrobial plastic product, said colloidal antimicrobial metal is also present/dispersed throughout the antimicrobial plastic product. Thus, the plastic product according to the present invention provides a resistance against microorganisms, even if the plastic product for example has scratches or is otherwise damaged.

A similar technology which is based on the deposition of colloidal antimicrobial metal is described in WO 01/09229 (please refer to paragraph [0006] and [0013] of the present published application).

Treatment with a rarely or a sparingly soluble salt of an antimicrobial metal

However, the present inventors have found that the products obtained by a treatment with an antimicrobial colloidal metal alone do not provide an immediate resistance against microorganisms. In order to improve the immediate action against microorganisms, the present invention teaches to additionally add a readily or sparingly soluble salt of an antimicrobial metal

to the intermediate product. The addition of said salt has the effect that the ultimately produced plastic products which comprise both the constituent of the intermediate product treated with a colloidal antimicrobial metal **and** a sparingly soluble antimicrobial metal salt show a significantly higher antimicrobial activity and provide immediate in addition to long-term resistance against microorganisms.

It is respectfully submitted that Jacobsen does not teach a treatment of the intermediate product with a colloidal antimicrobial metal, and additionally does not teach separate addition of a sparingly or rarely soluble antimicrobial metal salt to the intermediate product prior to forming an antimicrobial product.

Jacobson teaches to use an antimicrobial composition, e.g. of barium sulfate particles. According to the teachings of Jacobsen, said inorganic particles have successive coatings and *inter alia* comprise an antimicrobial coating layer of silver. The preparation of this antimicrobial component is described in further detail in Jacobson et al, column 5, lines 27 et seq. Therein it is described that the inorganic particles such as barium sulfate are provided with an antimicrobial silver coating layer, which can be deposited by precipitation. A respective coating layer of silver on barium sulfate particles as taught by Jacobsen differs from the teaching of step B of the present invention, wherein it is defined that an antimicrobial **colloidal** metal is deposited on the constituent of the intermediate product (such as barium sulfate). This is an important difference between Jacobsen and the present invention. According to the teaching of the present invention it is important that no continuous coating is produced as is, however, taught by Jacobson et al. That Jacobsen aims at the production of a coating layer covering the inorganic particles can be derived from the used term “coating” and “layer” as well as from column 4, lines 33 to 37, wherein it is taught that a **substantially total surface coverage** is supposed to be achieved by the deposited coating.

According to the present invention, finely dispersed colloidal, and thus nanoparticles of the antimicrobial metal are deposited on the intermediate product (e.g. barium sulfate). The use of colloidal metal significantly improves the antimicrobial activity as compared to a coating as is taught by Jacobsen. Deposited colloidal antimicrobial metal releases significantly more active silver than a coating, as the active silver surface is considerably extended when depositing colloidal particles.

Therefore, the present invention differs from Jacobson et al, as Jacobson does not teach to deposit a colloidal antimicrobial metal, but conversely teaches to deposit an antimicrobial coating, which is to be avoided with the teachings of the present invention. Additionally, Jacobsen teaches to provide further coating layers, which are also not used with the present invention.

Additionally, claim 1 is not anticipated by Jacobson because Jacobson does not teach to add a readily or sparingly soluble salt of an antimicrobial metal in addition to the treatment with the antimicrobial colloidal metal. The Office Action refers to column 5, line 32 to column 6, line 43 as a disclosure of aspect of the claim. Specifically, the Office Action asserts that Copper (II) Nitrate is disclosed as a readily soluble salt of a metal that is added. Close inspection of this section of Jacobson indicates that this assertion is not correct.

In the cited passage, the copper (II) oxide is described as a way to deposit a further coating layer on the silver coating deposited on the inorganic particle (e.g. barium sulfate). (It is noted that careful review of the cited passage does not reveal disclosure of Copper (II) Nitrate in the cited section of Jacobson at all.) Jacobson et al. therefore teaches to create a further coating from the copper (II) oxide. This teaching differs from the teaching of the present invention, which teaches to add a readily or sparingly soluble antimicrobial metal salt - basically in its free form - to the intermediate product in addition to the treatment with the colloidal antimicrobial metal. Therefore, step C of presently amended claim 1 is not disclosed in Jacobson.

It is therefore respectfully submitted that the present claims are not anticipated by Jacobson et al. Reconsideration and withdrawal of the outstanding rejection under 35 USC 102 is therefore requested.

Claim Rejections – 35 USC § 103

Claims 2-5, 15 and 17-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson et al (U.S. Patent No. 5,503,840), as applied to claim 1 (for claims 2-5 and 18) and claim 16 (for claim 17) above, in view of Terry (U.S. Patent No. 6,716,895).

As noted above, the present inventors have found that the products obtained by a treatment with an antimicrobial colloidal metal alone do not provide an immediate resistance against microorganisms. In order to improve the immediate action against microorganisms, the present invention teaches to additionally add a readily or sparingly soluble salt of an

antimicrobial metal to the intermediate product. The addition of said salt has the effect that the ultimately produced plastic products which comprise both the constituent of the intermediate product treated with a colloidal antimicrobial metal and a sparingly soluble antimicrobial metal salt show a significantly higher antimicrobial activity and provide immediate in addition to long-term resistance against microorganisms.

Also as noted above, Jacobsen et al. do not teach a treatment with a colloidal antimicrobial metal nor a treatment with a sparingly or rarely soluble antimicrobial metal salt. Instead, Jacobson et al. teach preparation of antimicrobial compositions comprising particles having a silver (or other metal) coating layer thereon.

Terry describes polymer coating compositions containing colloids comprised of salts of one or more oligodynamic metals, such as silver, dispersed in the composition. Terry does not disclose to treat a constituent of an intermediate product with an antimicrobial colloidal metal in the manner as presently claimed.

The cited references both fail to disclose or suggest a key element of the present claims - treating at least one constituent of the intermediate product with an antimicrobial colloidal metal. Thus, even in combination, the references fail to render the present invention obvious, because the skilled artisan would have had no reason to carry out the claimed method in the absence of a teaching of one of the key steps of the present process.

Further, the present invention is non-obvious, because the skilled artisan would have had no basis to predict that the ultimately produced plastic products which comprise both the constituent of the intermediate product treated with a colloidal antimicrobial metal and a sparingly soluble antimicrobial metal salt would show a significantly higher antimicrobial activity and provide immediate in addition to long-term resistance against microorganisms. The skilled artisan therefore would have had no reason to carry out the present method as claimed.

Reconsideration and withdrawal of the outstanding rejection under 35 USC 103 is therefore requested.

Allowable Subject Matter

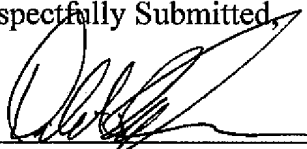
Claims 19 and 20 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants gratefully acknowledge indication of allowability of subject matter. It is believed that the present claims are all now in condition for allowance, and so Applicants decline to make the suggested amendment at this time.

CONCLUSION

In view of the above remarks and amendments, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office Action. Early favorable consideration of the above application is earnestly solicited. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9811.

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Respectfully Submitted,

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